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CEILING REFLECTOR

—FOR—

ILLUMINATION OF HALLS WITH DIFFUSED LIGHT.

HRABOWSKI'S SYSTEM,

GERMAN PATENT NO. 54724.

MANUFACTURED BY

Siemens & Halske Electric Company

OF AMERICA.

FACTORY & GENERAL OFFICES,

CHICAGO, ILLINOIS.

June, 1893.

(DRAWINGS NO. 0.511 AND 0.512.)

This reflector, invented by K. Hrabowski, our German Patent No. 54,724, is intended to obtain by electric arc lamps a light which will resemble as nearly as possible the light of day. Its conditions are therefore, to secure an intensely strong light, white, steady and even as possible; but it must not blind the eyes nor cast sharply defined shadows. The glowing carbon points must, therefore, be shaded and throw no direct rays to any part of the room.

The light must first be evenly diffused over a large and unpolished white surface and then be reflected by it into the hall or room to be illuminated.

All apparatus heretofore introduced for this purpose shows imperfections, as it either absorbs a large amount of light or distributes the same irregularly, or requires a white ceiling.

Hrabowski's improvement is based on a careful study of the distribution of light by continuous current arc lamps, as shown in Fig. 1.

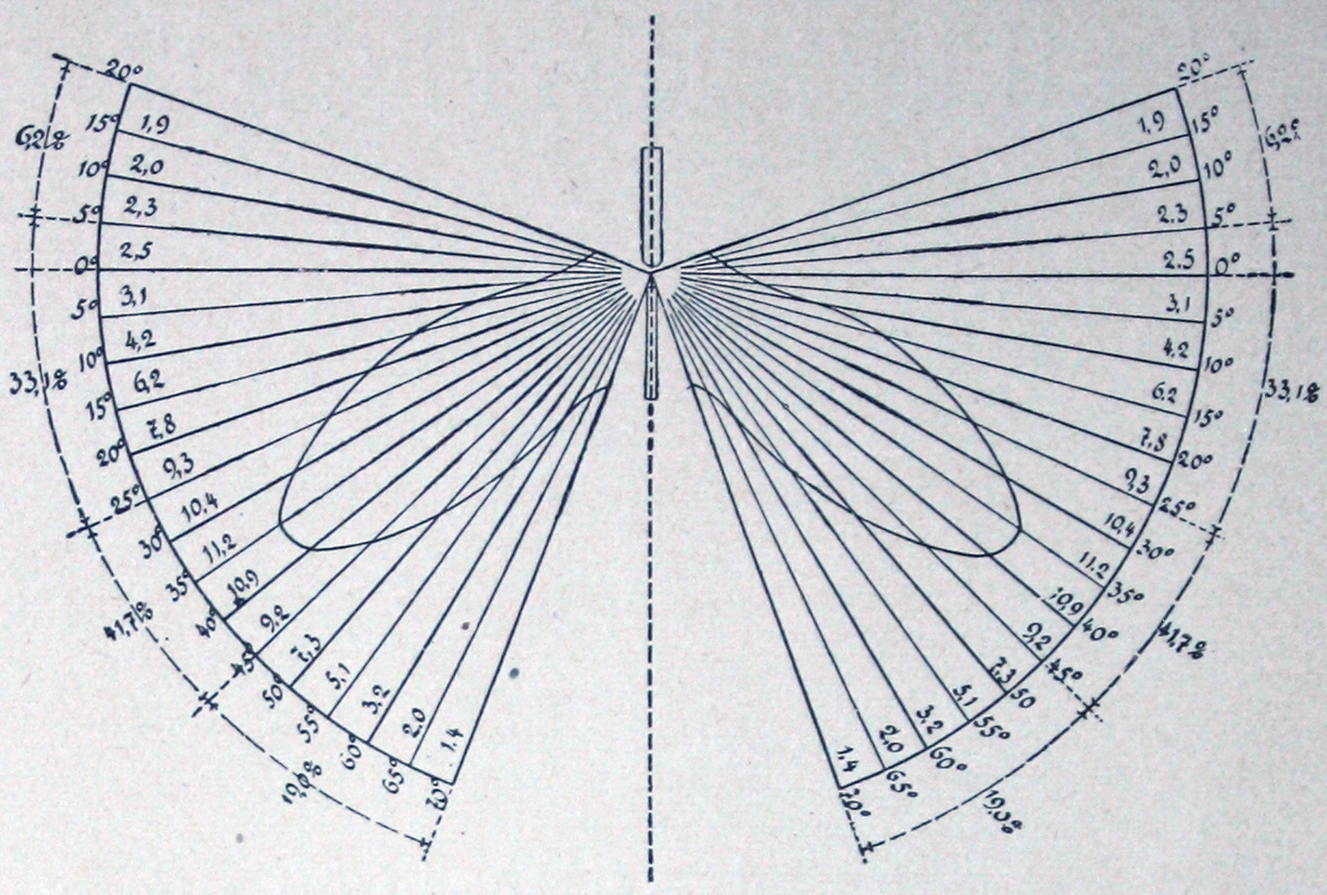

FIG. 1.

If a straight line be drawn from the focus in any direction until it intersects the inscribed curves its length will represent the intensity of the light thrown in that direction. There will be but little light thrown into a space lying above two lines that form angles of twenty degrees with a horizontal line, and but little thrown downward into a space lying between a vertical line and lines twenty degrees on either side of it, because in these spaces shadows thrown by carbons will interfere. As the surfaces of zones of a globe decrease in a certain ratio as they recede from a horizontal plane, the distribution of quantity of rays of light on the zones will differ in intensity. The quality of rays of light distributed is given in Fig. 1 for every five degrees and in percentages. It will be seen that the greatest quality of light is thrown between fifteen degrees and fifty degrees.

In the illuminating apparatus, as at first built, it was customary to reflect all rays thrown downward by means of a conical reflector against a white ceiling or against a white shade, and a second reflector threw them downward. As by this plan much light was lost by absorption, it was attempted to dispense with one reflection by inserting the positive carbon below, throwing its rays directly upward. The result was an unsteady light, because the positive carbon formed at its point a hollow crater in which the impurities of the carbons were collected. In the usual setting of carbons these impurities would fall down from the point of the burning negative carbon. The impurities and cinders of the carbons causing unsteadiness in the arc and flickering of the lamp.

In the arrangement which we are describing the positive carbon is again placed at the top. All rays falling downward as far as an angle of inclination of twenty-five degrees are caught by a conical reflector and are

thrown downward again. Rays having inclination of twenty-five degrees to forty-five degrees are made to pass through a prismatic glass ring, and this deflects them in a direction nearly horizontal, striking the reflector already referred to. The remaining rays, which have an inclination of forty-five degrees to seventy degrees, are caught by a translucent shade.

The ceiling reflector, shown in Fig. 2, consists of three principal parts, viz :

First—A large, flat bell shaped reflector, *A B C D E F.*

Second—A refractor "*L*" of opalescent glass.

Third—A glass ring "H."

A continuous current arc lamp with fixed focus is used with it.

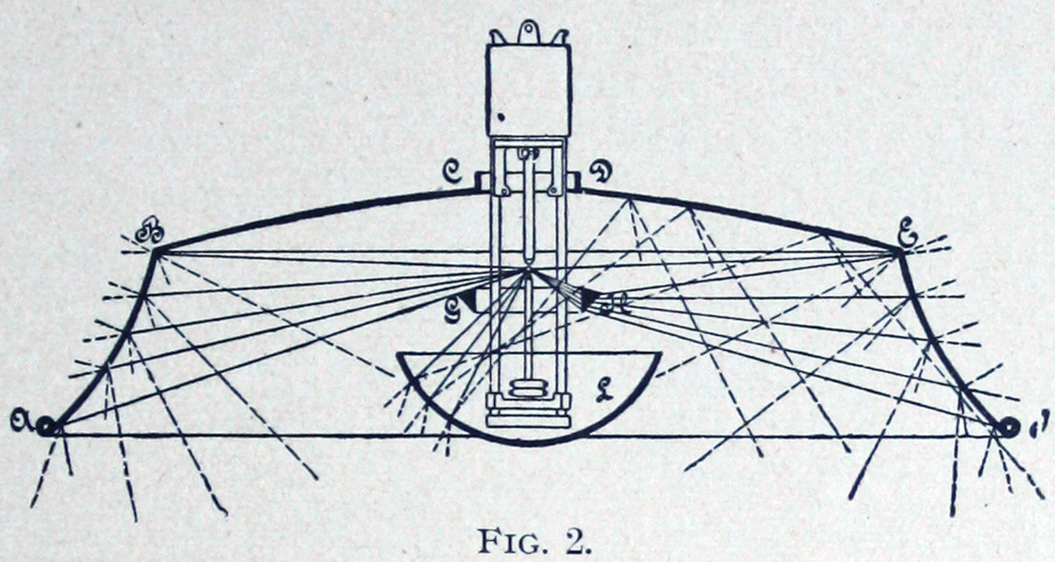

FIG. 2.
Scale, 1.20.

The large reflector of an opaque upper part, *B C D E*, and the translucent shade, *A B E F.* But little direct light will strike the upper part. The rays thrown from the focus directly on to the shade comprise about thirty-three per cent. of the total light. Those passing through the ring amount to about forty-two per cent., as shown in Fig. 1 ; hence, after deducting ten per cent. for losses in the glass ring, about seventy per cent. of the whole will strike this shade. A small portion of the rays will be refracted by the translucent shade and will throw a subdued light on the ceiling and upper part of the walls, while the greater portion is reflected and diffused below. The shade "*L*" being translucent, allows a portion of the light to pass through directly and throws the other part back against the upper part of reflector.

The relative position of the source of light and of the other parts is such that rays passing over upper edge of the glass ring will still strike the lower part of the great reflector, and rays passing below the ring will be caught by the refracted "L."

The illuminating surfaces being very large appear only moderately bright, but their shapes are such that the room below them will have a large circle of mild light of extraordinary evenness, and there will be no sharply defined shadows.

The following are the details of the apparatus :

A wire frame, section "*A B E F*," is covered with white, or, if for special purposes, with colored cloth (linen or something similar) and is slipped over the cover *B C D E*. This cover is concave, painted white, opaque, and is fastened to the lamp.

The glass ring and the lower refractor of opalescent glass with a plate for catching ashes, are suspended from this cover, so that they can be raised or lowered.

By means of a hoisting chain, the lamp and all the parts belonging to it can be lowered when the carbons have to be renewed. The translucent shade is fastened to the ceiling by three wires.

Care should be taken to draw the lamp up as high as possible ; a slight shadow, having a width of about 1½ inches, will then appear around the lower border of the hood. This prevents direct light, which might otherwise be shed when carbons burn somewhat irregularly. If there be any direct light over the top of the glass ring, this must be raised up. On the other hand, if the direct light appears below the ring it must be lowered, or else the refractor may be raised up.

This ceiling reflector is built in two sizes: one with a lower opening of 120 c. m. (48 inches), drawing 0.512. These sizes are fitted up to take the SIEMENS & HALSKE band arc lamps with fixed focus. The medium sized band lamp, drawings 5110–5119, is used for currents of three to nine amperes, and lamp, if largest size, drawings 5111–5120, for currents of 10 to 35 amperes.

The reflector has so far been principally used in rooms for drawing and modeling and has done exceedingly well. In painters' studios exhibitions of paintings and statuary, stores, offices, workshops, reading and lecture rooms it is also of great advantage.

Its main advantages, as we have said, are : slight loss of light, as it is reflected but once to reach its destination.

The light furnished is diffused light and illuminates uniformly a certain space, the dimensions of which depend on size of reflector shade and on its height above the floor.

The shadows do not appear hard and sharply defined, but soft and bright colored as in daylight. No white walls or white ceilings are needed to give full effect to the action of the reflector.

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